In its general makeup and appearance, we think the book commendable. As a personal opinion, we feel that it would have tended towards clarity if the translator had followed Cantor in italicizing the theorems. Further, we find the printing of the page numbers of the original papers in the text in bold-faced type somewhat disconcerting. They might well have been relegated to the margin and a smaller size of type used. Of misprints, which are liable to cause ambiguity, we note: on page 147, line 14, D ought to be replaced by G; and in line 21, F ought to be replaced by f.

As a contribution to the history of transfinite numbers, and in making the main two papers on the foundations of these numbers accessible in English, we think this little volume is worthy of consideration. As an introduction to the subject, however, it cannot be unqualifiedly recommended.

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Solid Geometry. By SOPHIA FOSTER RICHARDSON. Ginn and Co., Boston, 1914. v + 209 pages.

In applying to Professor Richardson's solid geometry the severe test of classroom use, it has been evident that the book possesses many excellent qualities. The use of a single letter to denote a line or a plane and the names skew lines, pencil of lines, pencil of planes, bundle of lines, bundle of planes have tended to make the work concise and the class demonstrations easy to follow. The first chapter contains more theorems than is usual in books on solid geometry. It provides a good drill in the more simple propositions that fix the concepts of perpendicularity and parallelism in space. A feature of interest to the student is the illustration of the principle of duality in several theorems differing only in the interchange of the words line and plane. Throughout the book there is an abundance of valuable and interesting exercises. However in many of the demonstrations a part of the work might well have been left for the student to supply.

The typographical errors are few, and in no instances misleading. The treatment of the incommensurable cases based on the Dedekind-Cantor theory of irrational numbers, presented in the appendix, is doubtless rigorous, but its advantages over the more ordinary methods have not been evident, since otherwise the work could be made much shorter and as rigorous as can be appreciated by first year college students. The propositions leading up to the determination of the surface and the volume of a sphere seem unnecessarily long and so involved that it becomes an arduous task even to quote them.

The formula for the volume of any parallelopiped is developed in two theorems, thus eliminating the celebrated "devil's coffin." This ruthless vandalism is regretted perhaps more by the expectant freshman, who has heard of its fame, than by the instructor, who has become calloused to its fearful and wonderful construction.

Taking everything into consideration it would seem that Professor Richardson

has written a book in advance of many text-books in solid geometry, and one adapted to students somewhat more mature than those of high school grade.

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L'Opera "De Corporibus Regularibus" di Pietro Franceschi detto della Francesca usurpata da Fra Luca Pacioli (con dodici tavole). Memoria di G. Mancini. Reale Accademia dei Lincei (anno CCCXII, 1915), Serie Quinta, Volume XIV, Fascicolo VII[B]. Pp. 437–580; reprint, pp. 1–144.

During the renaissance there were two noted Italian artists who were also mathematicians. Both were in personal touch with the mathematical oracle of that day, Luca Pacioli. The two artists were Leonardo da Vinci and Pier della Francesca. Recently the mathematical achievements of both of these artists have been subjected to re-examination.[1] That Pacioli used a posthumous manuscript of Pier della Francesca without giving him due credit was affirmed by early writers on Pier della Francesca,[2] but denied by two later biographers of Pacioli.[3] This question was re-opened by G. Pittarelli[4] at the International Mathematical Congress held in Rome in 1908, who asserted that parts of Pacioli's *Divina proportione* (1509) were taken from a Vatican manuscript written by Pier della Francesca. This matter is re-investigated in the monograph under review, in which the Pier della Francesca manuscript, "De Corporibus Regularibus," is published, with extensive comments. While Pacioli's guilt seems now definitely established, it appears also from the history of the time that usurpations of this character were not uncommon. Thus, Pacioli's great compatriots Tartaglia and Cardan are both open to this charge. Gerolamo Mancini's monograph establishes Pier della Francesca's place in the history of the regular solids and also in the advancement of the theory of perspective. From the drawings it appears that Pier della Francesca was a skilled draftsman. His exposition of problems on areas is almost wholly rhetorical. Mancini's biographical and critical parts of the monograph constitute a valuable contribution to the history of early Italian mathematics.

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[1] See P. Duhem, *Études sur Léonard de Vinci*, Paris, 1906.

[2] Vasari, *Vita di Pier della Francesca*, Firenze, 1550, 1568. Egnatio Danti, *Commentari alle due Regole di prospettiva di I. Barozzi*, about 1575.

[3] *Elogio di fra Luca Pacioli, Scritti inediti del P. D. Cossali, pubblicati da B. Boncompagni.* Roma, 1857. H. Staigmüller, *Lucas Paciuolo, eine biographische Skizze* (Zeitschr. f. Math. u, Phys., Bd. XXXIV, 1889).

[4] G. Pittarelli in *Atti del IV. Congresso dei matematici*, tom. III, Roma, 1909.